

I CLAIM:

1. Crane apparatus installed on a foundation situated in water, comprising: a crane movable along the foundation for unloading containers from a vessel docked along the foundation and placing the containers on a deck of the crane and for transferring the containers from the deck to another location; and a container security scanning system for scanning the containers while the containers are on the deck to determine the presence of radioactive material in the containers.

2. Crane apparatus according to claim 1; wherein the deck is located at the portal girder level of the crane.

3. Crane apparatus according to claim 1; wherein the container security scanning system comprises one or more scanning units disposed on the deck, each scanning unit having a scanning device movable beneath a container on the deck for scanning the container and detecting whether radioactive material is present in the container.

4. Crane apparatus according to claim 3; wherein each scanning unit comprises at least one scanning platform disposed on the deck for supporting thereon a container such that a bottom of the container is vertically spaced from the deck, the scanning device being movable beneath the container in the space between the bottom of the container and the deck.

5. Crane apparatus according to claim 4; wherein the scanning device of each scanning unit is movable along rails supported by support members.

6. Crane apparatus according to claim 5; wherein the support members are connected to the scanning platform.

7. Crane apparatus according to claim 5; wherein the support members are disposed on the deck.

8. Crane apparatus according to claim 3; wherein each scanning unit comprises at least one scanning platform disposed on the deck for supporting thereon a container, the scanning device being movable beneath the container in a space between an underside of the scanning platform and the deck.

9. Crane apparatus according to claim 8; wherein each scanning unit includes a set of rails along which moves the scanning device, and support members supporting the rails in the space between the underside of the scanning platform and the deck.

10. Crane apparatus according to claim 8; wherein at least one of the scanning units comprises two scanning platforms disposed on the deck in end-to-end relation for jointly supporting thereon one container or individually supporting thereon separate containers, the scanning device being movable beneath the container or containers in a space between an underside of the scanning platforms and the deck.

11. Crane apparatus according to claim 8; wherein each of the scanning units comprises two scanning platforms disposed on the deck in end-to-end relation for jointly supporting thereon one container or individually supporting thereon separate containers, the scanning device of each scanning unit being movable beneath the container or containers in a space between an underside of the scanning platforms and the deck.

12. Crane apparatus according to claim 4; wherein each scanning platform comprises a plurality of longitudinal support beams connected to a plurality of transverse support beams to define a platform for receiving thereon the container, and a plurality of legs connected to the platform for supporting the platform in an elevated position on the deck, the scanning device being movable beneath the platform.

13. Crane apparatus installed on a foundation situated in water, comprising: a crane movable along the foundation for unloading a container from a vessel docked along the foundation and placing the container on a deck of the crane and for transferring the container from the deck to another location; and a scanning device movable beneath the container while the container is on the deck to detect whether radioactive material is present in the container.

14. Crane apparatus according to claim 13; further comprising a scanning platform disposed on the deck and on which the container is placed by the crane, the scanning platform

supporting the container in an elevated position on the deck, and the scanning device being movable beneath the container in a space between an underside of the scanning platform and the deck to scan the container and detect whether radioactive material is present in the container.

15. Crane apparatus according to claim 14; further including a set of rails supported by support members in the space between the underside of the scanning platform and the deck, the scanning device being movable along the rails beneath the underside of the scanning platform.

16. Crane apparatus according to claim 15; wherein the support members are connected to the scanning platform.

17. Crane apparatus according to claim 15; wherein the support members are disposed on the deck.

18. Crane apparatus according to claim 14; wherein the scanning platform comprises a plurality of longitudinal support beams connected to a plurality of transverse support beams to define a platform for receiving thereon the container, and a plurality of legs connected to the platform for supporting the platform in an elevated position on the deck, the scanning device being movable beneath the platform.

19. Crane apparatus according to claim 13; further comprising two scanning platforms disposed on the deck in end-to-end relation for jointly supporting thereon one container

or individually supporting thereon separate containers, the scanning platforms supporting the container or containers in an elevated position on the deck, and the scanning device being movable beneath the container or containers in a space between an underside of the scanning platforms and the deck.

20. Crane apparatus according to claim 13; wherein the scanning device includes a gamma ray detector and a neutron detector.

21. Crane apparatus according to claim 13; wherein the scanning device includes at least one of a gamma ray detector and a neutron detector.

22. Crane apparatus according to claim 13; wherein the deck is located at the portal girder level of the crane.

23. Crane apparatus installed on a foundation situated in water for directly transshipping containers from a vessel moored alongside the foundation to a land transportation mode without necessity of ground placement of the containers, the crane apparatus comprising: a parent crane mounted on the foundation and displaceable therealong for unloading containers from a vessel moored alongside the foundation and placing the containers on a deck of the parent crane and for transferring containers from the deck to a platform of the parent crane; a container security scanning system for scanning the containers while on the deck to determine whether radioactive material is present in the containers; and a sibling crane mounted on the

foundation and displaceable therealong beneath the parent crane and independently of displacement of the parent crane for loading containers from the platform to a land transportation mode.

24. Crane apparatus according to claim 23; wherein the deck is located at the portal girder level of the crane.

25. Crane apparatus according to claim 23; wherein the container security scanning system comprises one or more scanning units disposed on the deck, each scanning unit having a scanning device movable beneath a container on the deck for scanning the container and detecting whether radioactive material is present in the container.

26. Crane apparatus according to claim 25; wherein each scanning unit comprises at least one scanning platform disposed on the deck for supporting thereon a container such that a bottom of the container is vertically spaced from the deck, the scanning device being movable beneath the container in the space between the bottom of the container and the deck.

27. Crane apparatus according to claim 26; wherein the scanning device of each scanning unit is movable along rails supported by support members.

28. Crane apparatus according to claim 27; wherein the support members are connected to the scanning platform.

29. Crane apparatus according to claim 27; wherein the support members are disposed on the deck.

30. Crane apparatus according to claim 25; wherein each scanning unit comprises at least one scanning platform disposed on the deck for supporting thereon a container, the scanning device being movable beneath the container in a space between an underside of the scanning platform and the deck.

31. Crane apparatus according to claim 30; wherein each scanning unit includes a set of rails along which moves the scanning device, and support members supporting the rails in the space between the underside of the scanning platform and the deck.

32. Crane apparatus according to claim 30; wherein at least one of the scanning units comprises two scanning platforms disposed on the deck in end-to-end relation for jointly supporting thereon one container or individually supporting thereon separate containers, the scanning device being movable beneath the container or containers in a space between an underside of the scanning platforms and the deck.

33. Crane apparatus according to claim 30; wherein each of the scanning units comprises two scanning platforms disposed on the deck in end-to-end relation for jointly supporting thereon one container or individually supporting thereon separate containers, the scanning device of each scanning unit being movable beneath the container or containers in a space between an underside of the scanning platforms and the deck.

34. Crane apparatus according to claim 26; wherein each scanning platform comprises a plurality of longitudinal support beams connected to a plurality of transverse support beams to define a platform for receiving thereon the container, and a plurality of legs connected to the platform for supporting the platform in an elevated position on the deck, the scanning device being movable beneath the platform.

35. Crane apparatus according to claim 23; wherein the land transportation mode is a rail-road mode.

36. Crane apparatus according to claim 23; wherein the land transportation mode is a road mode.

37. A method for screening containers for radioactive material during transshipment of the containers by a crane from a marine vessel to another location, comprising the steps of:

using a crane to transfer containers from a marine vessel to a deck of the crane;

scanning the containers while on the deck to determine whether radioactive material is present in the containers; and

using the crane to transfer the containers from the deck to either a first location or a second location depending on whether or not radioactive material is determined to be present in the containers.

38. A method according to claim 37; wherein the scanning step comprises scanning a scanning device beneath the containers while the containers are on the deck.



39. A method according to claim 38; wherein the scanning device detects for gamma ray emissions and/or neutron emissions.

40. A method according to claim 37; wherein the first using step comprises using the crane to transfer containers from the marine vessel to a scanning platform on the deck; the scanning step comprises scanning a scanning device beneath the containers while the containers are on the scanning platform to determine whether radioactive material is present in the containers; and the second using step comprises using the crane to transfer the containers from the scanning platform on the deck to either the first or second location depending on whether or not radioactive material is determined to be present in the containers.

41. A method according to claim 40; wherein the scanning step comprises scanning a scanning device beneath the containers while the containers are on the deck.

42. A method according to claim 37; wherein the first location comprises a transportation corridor for expediting movement of containers containing radioactive material, and the second location is one serviced by a land transportation mode.

43. A method according to claim 42; wherein the land transportation mode comprise rail-cars.

44. A method according to claim 42; wherein the land transportation mode comprise trailer-trucks.

45. A method according to claim 42; wherein the second using step includes using the crane to directly transfer containers from the deck to the second location without ground placement of the containers.

46. A method according to claim 45; wherein the second location is one serviced by a land transportation mode.

47. A method according to claim 46; wherein the land transportation mode comprise rail-cars.

48. A method according to claim 44; wherein the land transportation mode comprise trailer-trucks.

49. A method of retrofitting a crane to enable screening of containers for radioactive material during transshipment of the containers by the crane from a marine vessel to another location, comprising the steps of:

providing a scanning platform on a deck of the crane so that the crane can transfer containers from a marine vessel to the scanning platform; and

providing a movable scanning device beneath an underside of the scanning platform so that the scanning device can undergo scanning movement beneath a container on the scanning platform to detect whether radioactive material is present in the container before the container is transferred by the crane from the scanning platform to another location.

50. A method according to claim 49; wherein the scanning device is able to detect gamma ray emissions and/or neutron emissions.

51. A method according to claim 49; wherein the step of providing a scanning platform on a deck of the crane comprises installing a deck at the portal girder level of the crane if one is not present at that location, and providing the scanning platform on the deck located at the portal girder level of the crane.

52. A method according to claim 49; wherein the step of providing a scanning platform comprises providing two scanning platforms in end-to-end relation on the deck of the crane so that the crane can transfer one container to both scanning platforms or separate containers to each scanning platform; and the step of providing a movable scanning device comprises providing a movable scanning device beneath an underside of both scanning platforms so that the scanning device can undergo scanning movement beneath either one container on both scanning platforms or separate containers on each scanning platform.